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Authors **Ömer Uzunel**

Title ***3D Structural Analyses of Euromos Zeus Lepsynos Temple***

Abstract

Euromos is an ancient settlement where locate at three kilometers distance from south of Selimiye Town that depends on Milas district of Mugla province, in Turkey. Archeological relics were unearthed back to the archaic era as a result of the excavation works in Euromos. Initial excavation works were carried out in 1967 by Ümit Serdaroğlu. After forty-four years, excavation works have been resumed by Abuzer Kızıl since 2011.

There are many archeological relics in the ancient city. These principles relics are Theater, Agora, Zeus Lepsynos Temple and city walls. Unfortunately, these buildings used as a quarry by the surrounding villagers and materials of buildings had moved at the modern settlement.

The most important building is Zeus Lepsynos Temple in the ancient city. The temple square measures within 26.80 m by 14.40 m. Temple structure has a peripheral plan within 6 by 11 layouts of columns that built according as a Corinthian order in the 2nd century of A.D.

In 2012, documentation work was carried out with the *Leica C 10 Laser Scanner* in the temple. The aim of study was documentation and assessment studies before excavation in the temple area of the ancient city. An abnormality was determining in the 3D structure when the data obtained from scan process transferred to the data medium of 2D. According to abnormality; static structure of one column was disrupted where is the northwest corner of temple and this column has been made pulling force within another columns which are connect to itself. This abnormality has been presented grave danger for fall down of all temple construction. Scan progress has been studied at regular periods on the temple since after this detection and all data registered about to verify this abnormality is progress or stagnation.

The purpose of study reveals for this disorder of static structural and their reasons. Defect works of restoration to present in during the excavation and after excavation to the scientific world.

Authors **Douglas Cawthorne, Steffan Davies**

Title ***Authenticating Anastylosis: Para Data in the Digital Reconstruction of Greyfrairs Church Leicester and the Tomb of King Richard III***

Abstract

Creating visualisations of historic buildings and interiors from partial evidence requires realistically implementable strategies for managing the evidence upon which they are based and for documenting the decisions taken concerning the selection and value judgements made about that evidence. This paradata is essential for scholarly audiences for whom the degree of authentication and probability of correctness are central issues in developing trusted research. Several methods of generating this paradata are already recorded in the literature but while often systematic they are also complex and largely text based and for this reason it is recognised that their use is still the exception rather than the norm. In early 2014 Archaeologists at the University of Leicester in the UK discovered the remains of King Richard III, who died in 1485.

This internationally important archaeological discovery prompted Leicester City Council to commission the Digital Building Heritage Group at De Montfort University to use the newly discovered archaeological evidence and pre-existing literary and circumstantial evidence to create a highly detailed digital reconstruction for public exhibition of the now lost church and medieval precinct in which the king was buried. The international scrutiny surrounding this case required particular quality control over the paradata and the required development time for the reconstruction also required that any process used should be efficient, and practical to

implement in a compressed time-frame. Experience was therefore drawn from quality control processes in the construction industry to authenticate decision-making using a particular form of drawing we call "body-maps". These are graphic representations which specify options applicable to generic 2D and 3D representations of buildings and artefacts allow their development and change in design, allow the recording, over marking and notation of selections made, alternatives proposed, final decisions arrived at and official endorsement or "signing off" of the final visualistion. We have found this diagram based approach a time and cost efficient vehicle for generating a rich and accurate paradata record and one which can be easily stored digitally and retrieved for future examination. One of its advantages is that because they are largely graphical in format the "body-map" drawings can be read in chronological sequence and so provide a narrative with minimal use of explicitly narrative text. Factors which affect the method's use are the need for personnel who can use simple computer based drawing packages like Sketchup and Photoshop to create and modify the base "body-maps" and a willingness amongst the participants to engage in basic hand-drawing diagramming and over-marking on paper print-outs. Interestingly we found that formal drawing ability has little if any effect upon the utility of the process with all participants from a range of backgrounds able to intuitively engage with it. Furthermore the process actively encourages thoughtful and reflective practice and the development of shared frames of reference between different disciplines.

This paper explains the detail of the process we have developed, with examples of body-maps and their use, the resulting reconstructions and the methods we propose to archive and curate the paradata arising from it.

Authors **Melda Küçükdemirci, Salvatore Piro, Niyazi Baydemir, Daniela Zamuner, Elif Özer**

Title ***The application of mathematical and statistical integration Approach on archaeological prospection data, case studies from Aizanoi, Turkey.***

Abstract

The success of geophysical prospection methods applied on archaelogical sites, to detect and identify the buried structures under the ground, depends on the nature of the features such as physical and geometric properties and environmental effects such as soil conditions, sensibilty of equipments and experience of reserachers. Consequently, to obtain reliable and complemantary results, it is recomended to apply multi-geophysical methods and integration approaches on archelogeophysical field data (Weymouth, 1986; Neubauer et al,1997; Piro,2000; Clay,2001). An application of geophyscal integration methods which often appealed are divided into two class as qualitative and quantitative approches. Qualitative approache includes depicting the location of cultural features and interpretation of combined maps obtained from different geophysical methods. Besides that, quantitative approach includes the mathematical and statistical solutions for integration (Kvamme et al.,2006).

The purpose of this work is the application of mathematical and statistical integration approaches by using different geophysical data on archaeological site. For this purpose, the synthetic models were generated to correlate between integration approaches. The processes were applied on field data obtained by using ground penetrating radar and magnetic methods at the Aizanoi Archeological site, Kütahya, Turkey.

Primarily, the geophysical data were examined individually by referencing archaeological maps and the anomalies which are related to possible walls, roads or foundations were identified.In order to obtain clear informations about these anomalies, integration techniques were applied on field data. For the integration process, mathematical approaches as Sums and Products of the obtained processed maps and statistical approach as Principal Component Analysis were applied to elaborate the GPR and gradiometric datasets. The results of all integration approaches provided more details about the anomalies related to the archaeological features.